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Our Ref: 2078

25 February 2016

Clenergy Australia 11/20 Duerdin Street Clayton VIC 3168

#### **Array Frame Engineering Certificate**

### Installation of PV-ezRack<sup>®</sup> SolarRoof on Tin and Tile Roof flush installation with ECO-Rails

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian

Building Regulations, have carried out a structural design check of PV-ezRack<sup>®</sup> SolarRoof installation within Australia. The design check has been based on the information in the *PV-ezRack SolarRoof\_Code Compliant planning and Installation\_Guide AV\_V2.5* and schematic drawings of the system components by Clenergy (Xiamen) Technology Co. Ltd., provided by Clenergy Australia.

We find the Installation of PV-ezRack<sup>®</sup> SolarRoof on tin and tile roof to be structurally sufficient for Australian use based on the following conditions:

- Wind Loads to AS/NZ1170.2:2011 Admt 2-2012
- Wind Region A, B, C, D
- Wind Terrain Category 2 & 3
- Wind average recurrence interval of 100 years
- Maximum Building height 20 m
- Max. Solar Panel Dimensions 2000x1000 mm

#### Refer to attached summary table for interface spacing.

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

Yours faithfully, Gamcorp (Melbourne) Pty Ltd

Martin Gamble Managing Director MAICD

<u>Mudi Ariyarathna</u> B.Eng(Civil)(Hons)Monash, M.Eng&Mgt, MIEAust, CPEng, NPER, RBP EC-39699, RPEQ- 15899

Page 1 of 1 ISO 9001:2008 Registered Firm Certificate No: AU1222





Gamcorp (Melbourne) Pty Ltd Consulting Structural & Civil Engineers A.C.N 141 076 904 A.B.N 73 015 060 240

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# Structural Design Documentation

# PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table According to AS/NZS 1170.2-2011 Amdt 2-2012 With ECO-Rails Within Australia Terrain Category 2

For: Clenergy Australia





Job Number:2078Date:23 August 2016

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ISO 9001:2008 Registered Firm Certificate No: AU1222

Job No: 2078

- Client: Clenergy Australia
- Project: <u>PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table</u>
- Address: Within Australia

### Australian Standards

AS 1170. 2011 – Structural Design Actions

- Part 0 General Principles
- Part 1 Permanent imposed and other actions
- Part 2 Wind Actions
- Part 3 Snow and Ice Actions
- AS 1252 High Strength Structural Bolting
- AS 3600 Concrete Structures
- AS 4055 Wind Loads for Housing
- AS 4100 Steel Structures
- AS 4600 Cold-Formed Steel Structures

Wind Terrain Category:

WTC 2

Designed: M.A

Date: Aug-16



Client: Clenergy Australia Project: <u>PV-ezRack® SolarRoof Interface Spacing Table</u> Address: Within Australia Designed:M.A Job: 2078 Date: Aug-16

REV J

PV-ezRack <sup>®</sup> SolarRoof	Interface spacing	Table for Tile Roof

Type of Rail	ER
Type of Interface	ER
Solar Panel Dimension	2n
Terrain category	2

ER-R-ECO (Eco Rail) ER-I-01 (Tile Interface) 2mx1m

Roof Angle (Φ) –	5° - 10°

Wind	Building Height – H (m)								
Region		H≤	≤10	10 <h< td=""><td>H≤15</td><td>15&lt;</td><td>:H≤20</td></h<>		H≤15	15<	:H≤20	
		D.W & U.W	Central		D.W & U.W	Central	D.W & U.W	Central	
A	-	1265	1635		1131	1587	1060	1535	
В		885	1270		794	1135	747	1064	
С	-	568	803		512	722	482	679	
D	-	364	509		329	459	310	432	

	Roof Angle (Φ) –		10° - 20	)°						
Wind		Building Height – H (m)								
Region		H≤	≤10		10<	H≤15		15<	H≤20	
		D.W & U.W	Central		D.W & U.W	Central	I L	D.W & J.W	Central	
А		961	1414		862	1262		810	1182	
В		679	984		611	883		575	829	
С		440	630		397	567		374	534	
D		283	402		256	363		241	342	

	Roof Angle (Φ) –		20° - 30	0					
Wind	Building Height – H (m)								
Region		H	≤10		10<	:H≤15	15<	:H≤20	
		D.W & U.W	Central		D.W & U.W	Central	D.W & U.W	Central	
А	_	1045	1265		936	1131	879	1060	
В	_	736	885		662	794	623	747	
С	_	476	568		429	512	404	482	
D	_	306	364		276	329	261	310	

D.W & U.W – Downwind and Upwind refer to note 6.



Client: Clenergy Australia Project: <u>PV-ezRack® SolarRoof Interface Spacing Table</u> Address: Within Australia Designed:M.A

Job: 2078 Date: Aug-16

REV J

Wind Region	H≤	$H \le 10$						
	Interme diate	Internal	Interm ediate	Internal	Interme diate	Internal		
A	1151	1571	1063	1464	1015	1402		
В	886	1237	810	1144	762	1093		
С	580	886	522	810	492	761		
D	371	570	335	513	316	483		



Client: Clenergy Australia Project: <u>PV-ezRack® SolarRoof Interface Spacing Table</u> Address: Within Australia Designed:M.A Job: **2078** Date: **Aug-16** 

REV J

PV-ezRack <sup>®</sup>	SolarRoof	Interface	spacing	Table for	<sup>.</sup> Tin Roof

Type of Rail
Type of Interface
Solar Panel Dimension
Terrain category

ER-R-ECO (ECO-Rail) ER-I-05 (Tin Interface) 2mx1m 2

Roof Angle (Φ) –	5° - 10°

Wind	Building Height – H (m)								
Region	H	≤10	10<	10 <h≤15< th=""><th>:H≤20</th></h≤15<>		:H≤20			
	D.W & U.W	Central	D.W & U.W	Central	D.W & U.W	Central			
A	1487	1635	1446	1587	1423	1561			
В	1360	1488	1324	1447	1303	1424			
С	1217	1327	1186	1292	1169	1273			
D	1089	1184	1062	1154	1046	1137			

	Roof Angle (Φ) –		10° - 20	0					
Wind		Building Height – H (m)							
Region		H≤	≤10		10<	H≤15	15<	:H≤20	
		D.W & U.W	Central		D.W & U.W	Central	D.W & U.W	Central	
А		1388	1529		1351	1486	1330	1462	
В		1273	1397		1240	1359	1221	1338	
С		1142	1249		1113	1217	1097	1199	
D		1023	1117		993	1088	983	1072	

	Roof Angle (Φ) –		20° - 30	)°					
Wind	Building Height – H (m)								
Region		H≤	≦10		10 <h≤15< td=""><td>15&lt;</td><td>H≤20</td></h≤15<>		15<	H≤20	
		D.W & U.W	Central		D.W & U.W	Central	D.W & U.W	Central	
A	_	1418	1487		1379	1446	1358	1423	
	-								
В	-	1299	1360		1265	1324	1246	1303	
	-								
C	-	1164	1217		1135	1186	1118	1169	
D		1043	1089		1017	1062	1002	1046	

D.W & U.W – Downwind and Upwind refer to note 6.



Client: Clenergy Australia Project: <u>PV-ezRack® SolarRoof Interface Spacing Table</u> Address: Within Australia Designed:M.A

Job: 2078 Date: Aug-16

REV J

Wind		Du					
Region		H≤10		10<	H≤15	15<	H≤20
	Inte diat	rme e Intern	al e	Interm diate	Internal	Interme diate	Internal
A	14	52 157	1	1424	1542	1407	1526
			-				
В	13	60 147	9	1330	1450	1310	1434
С	12	23 136	D	1223	1330	1174	1310
D	10	94 121	B	1067	1187	1051	1169



	Relationship	s built on	trust								
Client: Project: Address:	Clenergy Australia Ct: <u>PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table</u> SS: Within Australia							2078 Aug-16	5		
Designed	: <b>M.A</b>						REV J				
Noto 1	General Notes	ambadm	ont long	th into t	imbor 25 mm						
Note 1	Screws minimum	embeun	lent leng								
Note 2	Recommended sc	rews									
	Metal Purlins/B	attens		Fasten	ers to use						
	0.55 mm – 1.5 m	m		M6-11 TPI RoofZips							
	1.9 mm			M6-11 TPI RoofZips OR 12g-14 TPI Teks screws							
	2.4 mm and Abov	'e		12g-24	12g-24 TPI Teks screws						
	Wood purlins ar	nd Rafte	r	Fasten	ers to use						
	Pine and Hardwoo embedment and a	od (35mr above)	n	M6-11	TPI RoofZips OR	14g-10 TPI					
	I										
Note 3	Above Spacing ca	lculated	based on	1.9mm	steel purlin OR I	F17 Hardwood					
	For Wind region C & D spacing for Ti				should be reduc	ed as follows,		_			
	Material			Wind R	egion C	Wind F	Region	D			
	0 FF mm staal Battan			0/-	D.W & U.W		D.W	<b>&amp; U.W</b>			
	0.55 mm steel Batten		22	70 2/2	25%	10%	42	2 %0 0/2			
			0	/0	0 /0	1070		70			
Note 4	Following compor	ents are	satisfied	to use	according to AS1170.2011						
	Components	Part Number		10 400		Descrip	tion				
	ECO-Rail	ER-R-E	20		ECO-Rail						
C A	Corrugated										
	Adapter	ER-AD-	_110		Adapter for corr	ugated fron roc	ρr				
	Hanger Bolt	ER-HB-	200/WO	1P	Hanger Bolt with timber purlin on	nout mounting ly	plate M1	.0x200. F	ixed to		
	Roof extender	ER-RE-2	200		Roof Hook Extender 200mm						
Note 5	Terrain category 2 having heights ge hectare.	2 (TC2) r nerally fi	efers to rom 1.5	open ter m to 5 n	rrain, including g n, with no more t	rassland, with than two obstru	well-sca uction pe	ttered ob er obstru	structions ctions per		
Note 6	For the definition	of Down	wind, Up	wind en	d and middle,						
	refer attached fig	ure D9 fr	om AS/N	IZS 117	0.2-2011 Amdt 2	-2012.					
							. = . /				
Note /	For PV panels with	n length	of 1700n	nm, incr	ese the spacing i	in the tables by	/ 15%.				
-		note with	T HOLE O								
Note 8	When using 3 rail	s. increa	se the sn	acing in	the tables by 11	%.					
	When using 4 rail	s, increa	se the sp	acing in	the tables by 19	9%.					
	Do not apply this	note witl	n note 7	at the s	ame time.						
	1										
Note 9	For PV panels wit	h length	of 1650n	nm,							
	When using 2 rail	s, increa	se the sp	acing in	the tables by 16	5%.					
	When using 3 rail	s, increa	se the sp	acing in	the tables by 19	9%.					
	When using 4 rail	s, increa	se the sp	acing in	the tables by 25	5%.					



Gamcorp (Melbourne) Pty Ltd Consulting Structural & Civil Engineers A.C.N 141 076 904 A.B.N 73 015 060 240

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# Structural Design Documentation

## PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table According to AS/NZS 1170.2-2011 Amdt 2-2012 With ECO-Rails Within Australia Terrain Category 3

For: Clenergy Australia





Job Number:2078Date:23 August 2016

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ISO 9001:2008 Registered Firm Certificate No: AU1222

- Job No: 2078
- Client: Clenergy Australia
- Project: <u>PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table</u>
- Address: Within Australia

### **Australian Standards**

AS 1170. 2011 – Structural Design Actions

- Part 0 General Principles
- Part 1 Permanent imposed and other actions
- Part 2 Wind Actions
- Part 3 Snow and Ice Actions
- AS 1252 High Strength Structural Bolting
- AS 3600 Concrete Structures
- AS 4055 Wind Loads for Housing
- AS 4100 Steel Structures
- AS 4600 Cold-Formed Steel Structures

### Wind Terrain Category:

WTC 3

Designed: M.A

Date: Aug-16



Client:	Clenergy Australia	Job:	2078
Project:	<u>PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table</u>	Date:	Aug-16
Address:	Within Australia		
Designed:	M.A	REV J	
	PV-ezRack <sup>®</sup> SolarRoof Interface spacing Table for Tile Roof		

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2mx1m
Terrain category	3

	Roof Angle $(\Phi)$ –		5° - 10°							
Wind	Building Height – H (m)									
Region		H≤10			10<	H≤15	15<	15 <h≤20< th=""></h≤20<>		
		D.W & U.W	Central		D.W & U.W	Central	D.W & U.W	Central		
A	-	1663	1846		1593	1761	1463	1700		
В	-	1353	1665		1151	1595	1016	1468		
С	-	853	1222		731	1042	649	921		
D	-	539	761		465	654	414	581		

	Roof Angle (Φ) –		10° - 20°								
Wind	Building Height – H (m)										
Region		H	≤10	10 10<		15<	H≤20				
		D.W & U.W	Central	D.W & U.W	Central	D.W & U.W	Central				
А		1476	1714	1253	1640	1105	1587				
В	_	1025	1514	877	1285	777	1132				
	-										
С		655	948	563	812	501	720				
D		418	597	361	514	322	458				

	Roof Angle ( $\Phi$ ) –		20° - 30	0						
Wind			Buildi	ng Heig	ht – H (I	m)				
Region		H≤10			10<	H≤15	1	15 <h≤20< th=""></h≤20<>		
	·	D.W & U.W	Central		D.W & U.W	Central	D.W U.W	&	Central	
А	-	1580	1663		1366	1593	12	03	1463	
В		1115	1353		952	1151	84	13	1016	
С		710	853		610	731	54	13	649	

D.W & U.W – Downwind and Upwind refer to note 6.

D



Client:	Clenergy Australia	Job:	2078
Project:	<u>PV-ezRack<sup>®</sup> SolarRoof Interface Spacing Table</u>	Date:	Aug-16
Address:	Within Australia		
Designed:	M.A	REV J	

Wind	Roof Angle (Φ) –	oof Angle (Φ) – 30° - 60° Building Height – H (m)									
Region		H	≤10 <u> </u>	10<	10 <h≤15 15<h≤20<="" th=""></h≤15>						
		Interme diate	Internal	Interme diate	Internal	Interme diate	Internal				
Α		1536	1676	1383	1637	1270	1606				
В	-	1205	1587	1077	1481	984	1363				
С	-	862	1205	746	1076	662	983				
D	-	550	850	474	733	422	651				



Client: Project: Address:	Clenergy Austra PV-ezRack <sup>®</sup> Sola Within Australia	Clenergy Australia <u>PV-ezRack® SolarRoof Interface Spacing Table</u> Within Australia									
	PV-ezRack <sup>®</sup> Sola	arRoof I	nterface sp	pacing Table	for Tin Re	oof					
	Type of Rail Type of Interface Solar Panel Dimer Terrain category Roof Angle (Φ) –										
Wind		1	Building	Height – H (r	n)						
Region		H	≤10	10<	H≤15	15<	H≤20	_			
		D.W & U.W	Central	D.W & U.W	Central	D.W & U.W	Central	_			
A	_	1663	1846	1553	1761	1542	1700	_			
B	-	1512	1665	1452	1595	1408	1543				
	-		1000		1000	1.00		_			
С	-	1347	1474	1297	1417	1259	1374	_			
D	-	1202	1310	1158	1261	1125	1224				
Wind Region	Roof Angle (Φ) –	H	10° - 20° Building ≤10	Height – H (r 10<	n) H≤15	15<	H≤20				
	1	D.W & U.W	Central	D.W & U.W	Central	D.W & U.W	Central				
A	-	1546	1714	1484	1640	1438	1587	_			
В	_	1411	1555	1357	1493	1316	1446	_			
C	-	1261	1384	1215	1331	1180	1292	_			
	-	1107	1222	1097	1100	1056	1154	_			
		112/	1223	108/	1199	1056	1154				
	Roof Angle (Φ) –		20° - 30°		>						
Wind Region		Н	builaing ≤10		<u>'')</u> H≤15	15<	H≤20	-			
		D.W & U.W	Central	D.W & U.W	Central	D.W & U.W	Central	-			
A	-	1580	1663	1516	1593	1469	1542	_			
В	-	1441	1512	1385	1452	1344	1408	_			
С	-	1287	1347	1239	1297	1203	1259	_			
D	-	1149	1202	1108	1158	1077	1125	_			
	1			1100		10,7					

D.W & U.W – Downwind and Upwind refer to note 6.



Client:	Clenergy Australia	Job:	2078
Project:	PV-ezRack <sup>®</sup> SolarRoof Interface Spacing Table	Date:	Aug-16
Address:	Within Australia		
Designed:	M.A	REV J	

Wind			Building	Height – H (r	n)		
Region		H	≤10	10<	H≤15	15<	H≤20
	1	Interme diate	Internal	Interme diate	Internal	Interme diate	Internal
Α	_	1570	1648	1520	1621	1489	1606
В	_	1478	1587	1428	1547	1396	1515
С	_	1359	1469	1303	1428	1265	1396
D	_	1214	1346	1163	1297	1130	1259



Note 3   Abve Spacing Calculated based on 1.9mm steel purilin OR, F12 Hardwood     Note 4   Recommended screws     Metal Puriling/R Battens   Fasteners to use     0.55 mm - 1.5 mm   M6-11 TPI RoofZips     1.9 mm   M6-11 TPI RoofZips OR 12g-14 TPI Teks screws     Wood purilins and Rafter   Fasteners to use     Pine and Hardwood (35mm   M6-11 TPI RoofZips OR 14g-10 TPI     mode dwood (35mm devoed)   M6-11 TPI RoofZips OR 14g-10 TPI     Mote 3   Above Spacing calculated based on 1.9mm steel purlin OR. F17 Hardwood     For Wind region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C     Wind Region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C     0.55 mm steel Batten   0%   0%     0.55 mm steel Batten   0%   0%     0.75 mm steel Batten   0%   0%     0.75 mm steel Batten   0%   0%     0.76 main geoments are satisfied to use according to AS1170.2011   Components     Corrugated Lapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Boit   ER-RE-200   Roof Hook Extender 200mm     Roof extender <t< th=""><th>Client: Project:</th><th>Clenergy Austra PV-ezRack<sup>®</sup> Sol</th><th>Job: Date:</th><th>2078 Aug-16</th><th>5</th></t<>	Client: Project:	Clenergy Austra PV-ezRack <sup>®</sup> Sol	Job: Date:	2078 Aug-16	5									
General Notes       Note 1     Screws minimum embedment length into timber 35 mm. Holes must be pre drilled.       Note 2     Recommended screws       Metal Purins/Battens     Fasteners to use       0.55 mm - 1.5 mm     M6-11 TPI RoofZips OR 12g-14 TPI Teks screws       2.4 mm and Above     112g-24 TPI Teks screws       Wood purlins and Rafter     Fasteners to use       Pine and Hardwood (35 mm     M6-11 TPI RoofZips OR 14g-10 TPI       embedment and above)     M6-11 TPI RoofZips OR 14g-10 TPI       Note 3     Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood       Note 4     Components are satisfied to use according to A51170.2011       Components     Part Mumber       Corrugated     ER-RECO       ECO-Rail     ER-RECO       Corrugated     Re-AD-C110       Adapter     Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only       Roof extender     ER-RE-200     Roof Hook Extender 200mm       Note 5     Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example subtraan housing or light industrial estates. Refer clause 4.2: 1 of A5/NZ5 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.       Note 6	Designed:	M.A	a					REV J						
Note 1     Screws minimum embedment length into timber 35 mm. Holes must be pre drilled.       Note 2     Recommended screws       Metal Purlins/Battens     Fasteners to use       0.55 mm - 1.5 mm     M6-11 TPI RoofZips OR 12g-14 TPI Teks screws       Wood purlins and Rafter     Fasteners to use       Pine and Hardwood (35mm embedment and above)     M6-11 TPI RoofZips OR 14g-10 TPI       Note 3     Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood       For Wind region C & D spacing for Tin Roof should be reduced as follows,       Material     Wind Region C       Wind Region C     Wind Region D       Material     Wind Region C       0.75 mm steel Batten     22%       0.75 mm steel Batten     22%       0.75 mm steel Batten     22%       0.75 mm steel Batten     2%       0.75 mm steel Batten     2% <td></td> <td>General Notes</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		General Notes												
Note 2     Recommended screws       Metal Purlins/Battens     Fasteners to use       0.55 mm - 1.5 mm     M6-11 TPI RoofZips OR 12g-14 TPI Teks screws       2.4 mm and Above     12g-24 TPI Teks screws       Wood purlins and Rafter     Fasteners to use       Pine and Hardwood (35mm embedment and above)     M6-11 TPI RoofZips OR 12g-14 TPI Teks screws       Note 3     Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows, Material       Material     Wind Region C     Wind Region D       0.55 mm steel Batten     22%     25%     30%     42%       0.75 mm steel Batten     0%     0%     10%     5%       Note 4     Following components are satisfied to use according to AS1170.2011     Corrugated Corrugated     Adapter     ECO-Rail       Corrugated     RA-D-C110     Adapter for corrugated iron roof Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof Hock Extender 200mm       Note 5     Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Iterrain category 3.       Note 6     For the	Note 1	Screws minimum	e drille	J.										
Note 2   Recommended screws     Metal Purins/Battens   Fasteners to use     0.55 mm - 1.5 mm   M6-11 TPI RoofZips OR 12g-14 TPI Teks screws     1.9 mm   M6-11 TPI RoofZips OR 12g-14 TPI Teks screws     2.4 mm and Above   12g-24 TPI Teks screws     Wood purlins and Rafter   Fasteners to use     Pine and Hardwood (35mm embedment and above)   M6-11 TPI RoofZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood     For Wind region C & D spacing for Tin Roof should be reduced as follows,   Material     Material   Wind Region C   Wind Region D     0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-AD-C110   Adapter for corrugated iron roof   Adapter   Hanger Bolt without mounting plate M10x200. Fixed to time or for woof extender   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-														
Metal Purlins/ Battens   Fasteners to use     0.55 mm - 1.5 mm   M6-11 TPI RooTZips OR 12g-14 TPI Teks screws     2.4 mm and Above   12g-24 TPI Teks screws     Wood purlins and Rafter   Fasteners to use     Pine and Hardwood (35mm embedment and above)   M6-11 TPI RooTZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D Spacing for Tin Roof should be reduced as follows, Material   Wind Region C     Material   Wind Region C   Wind Region D     Middle   D.w & U.W   Middle   D.w & U.W     0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components     Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail   ECO-Rail     Corrugated   Adapter   FA-D-C110   Adapter for corrugated iron roof     Adapter   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-R-E-200   Roof Hook Extender 200mm <td< td=""><td>Note 2</td><td>Recommended so</td><td></td><td></td><td></td><td></td></td<>	Note 2	Recommended so												
0.35 mm   Model 11 TPI RoofZips OR 12g-14 TPI Teks screws     2.4 mm and Above   12g-24 TPI Teks screws     Wood purins and Rafter   Fasteners to use     Pine and Hardwood (35mm embedment and above)   M6-11 TPI RoofZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood     For Wind region C & D spacing for Tin Roof should be reduced as follows, Material   Wind Region C     Material   Wind Region C   Wind Region D     0.75 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail   Corrugated iron roof   Adapter for corrugated iron roof     Adapter   ER-AD-C110   Adapter for corrugated iron roof   Adapter   For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZ5 1170.2-2011 Amdt 2-2012. Fixed to timber purlin only     Roof extender   ER-R-ECO   Roof Hook Extender 200mm   For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZ5 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 5   For E		Metal Purlins/E	Battens		Fasteners to use									
1/3 mini   INDIT INTOLUDE ON Light FITTERS Steres     2.4 mm and Above   12g-24 TPT Res Screws     Wood purlins and Rafter   Fasteners to use     Pine and Hardwood (35mm embedment and above)   M6-11 TPI RoofZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C   Wind Region D     0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Corrugated     Corrugated   ER-R-ECO   ECO-Rail   Corrugated iron roof     Adapter   ER-AD-C110   Adapter for corrugated iron roof   Adapter     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZ5 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6		0.55 mm - 1.5 mm			M6-11 TPI RoofZins OR 120-14 TPI Teks scrows									
Bit Num and Normality   Pastements to use     Prine and Hardwood (35mm embedment and above)   M6-11 TPI RoofZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows, Material   Wind Region D     Material   Wind Region C   Wind Region D     0.55 mm steel Batten   22%   25%   30%   42%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail   ECO-Rail   Corrugated for corrugated iron roof     Adapter   ER-R-D-C110   Adapter for corrugated iron roof   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.   Note 700 mm since with note 8 at the same time.     Note 6   For PV panels with length of 1700mm, increse the spacing in the tab		2.4 mm and Above			12a-24 TPI Teks screws									
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embedment and above)   M6-11 TPI RoofZips OR 14g-10 TPI     Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C   Wind Region D     Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C   Wind Region D     Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood For Wind region C & D spacing for Tin Roof should be reduced as follows,     0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-RECO   ECO-Rail   Corrugated Adapter   Adapter   ER-AD-C110   Adapter for corrugated iron roof     Adapter   Boit eR-RE-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only   Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/		Pine and Hardwood (35mm												
Note 3   Above Spacing calculated based on 1.9mm steel purlin OR F17 Hardwood     For Wind region C & D spacing for Tin Roof should be reduced as follows,     Material   Wind Region C   Wind Region D     Middle   D.% & U.W   Middle   D.% & U.W     0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail   Corrugated   R-AD-C110   Adapter for corrugated iron roof     Adapter   Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only   Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6		embedment and above)			M6-11 TPI RoofZips OR 14g-10 TPI									
For Wind region C & D spacing for Tin Roof should be reduced as follows,       Material     Wind Region C     Wind Region D       Material     Wind Region C     Wind Region D       0.55 mm steel Batten     22%     25%     30%     42%       0.75 mm steel Batten     0%     0%     10%     5%       Note 4     Following components are satisfied to use according to AS1170.2011     Components     Part Number     Description       ECO-Rail     ER-RECO     ECO-Rail     Corrugated iron roof     Adapter       Hanger Bolt     ER-AD-C110     Adapter for corrugated iron roof     Adapter       Hanger Bolt     ER-RE-200     Roof Hook Extender 200mm     Note 5       Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.       Note 6     For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.       Note 7     For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.       Note 8     When using 3 rails, increase the spacing in the tables by 19%. Do	Note 3	Above Spacing ca	alculated I	based on	1.9mm	steel purlin OR F	17 Hardwood							
Material     Wind Region C     Wind Region D       0.55 mm steel Batten     22%     25%     30%     42%       0.75 mm steel Batten     22%     25%     30%     42%       0.75 mm steel Batten     0%     0%     10%     5%       Note 4     Following components are satisfied to use according to AS1170.2011     Components     Part Number     Description       ECO-Rail     ER-R-ECO     ECO-Rail     Corrugated     RApter     Adapter       Hanger Bolt     ER-HB-200/WOMP     Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender     ER-RE-200     Roof Hook Extender 200mm       Note 5     Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.       Note 6     For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.       Note 7     For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.       Note 8     When using 3 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.		For Wind region	C & D spa	cing for <sup>-</sup>	Tin Roof	should be reduce	ed as follows,							
MiddleD.W & U.WMiddleD.W & U.W0.55 mm steel Batten22%25%30%42%0.75 mm steel Batten0%0%10%5%Note 4Following components are satisfied to use according to AS1170.2011ComponentsPart NumberDescriptionECO-RailER-R-ECOECO-RailCorrugated iron roofAdapterDescriptionAdapterER-AD-C110Adapter for corrugated iron roofHanger Bolt timber purlin onlyRoof extenderER-RE-200Note 5Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.Note 6For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.Note 7For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.Note 9For PV panels with length of 1650mm, When using 3 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.Note 9For PV panels with length of 1650mm, When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the table		Material	•		Wind F	legion C	Wind I	Region D						
0.55 mm steel Batten   22%   25%   30%   42%     0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011   Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail   Corrugated   Adapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only   Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 9   For PV panels with length of 1650mm, When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase				Mid	ldle	D.W & U.W	Middle	D.W	& U.W					
0.75 mm steel Batten   0%   0%   10%   5%     Note 4   Following components are satisfied to use according to AS1170.2011     Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail     Corrugated   ER-AD-C110   Adapter for corrugated iron roof     Adapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 9   For PV panels with length of 1650mm, When using 3 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 3 rails, increase the spacing in the tables by 19%. When using 3 rails, increase the spacing in the tabl		0.55 mm steel B	atten	22	.%	25%	30%	4	2%					
Note 4   Following components are satisfied to use according to AS1170.2011     Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail     Corrugated   Adapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 8   When using 3 rails, increase the spacing in the tables by 11%. When using 4 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 2 rails, increase the spacing in the tables by 16%. When using 3 rails, increase the spacing in the tables by 15%. When using 4 rails, increase the spacing in the tables by 15%. When using 4 rails, increase the spacing in the tables by 15%. When using 4 rails, increase the spacing in the tables by		0.75 mm steel B	atten	00	%	0%	10%	5	5%	J				
Note 4   Following components are satisfied to use according to AS1170.2011     Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail     Corrugated Adapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 8   When using 3 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 2 rails, increase the spacing in the tables by 16%. When using 3 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 25%. <	Nata 4	<b>F</b> - U			<b>h</b>		70 2011							
Components   Part Number   Description     ECO-Rail   ER-R-ECO   ECO-Rail     Corrugated Adapter   ER-AD-C110   Adapter for corrugated iron roof     Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 8   When using 3 rails, increase the spacing in the tables by 11%. When using 4 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 2 rails, increase the spacing in the tables by 16%. When using 3 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 25%.	Note 4	Following compo	nents are	satisfied	to use a	according to AST.	<u>170.2011</u>	tion						
Intervention   Intervention     Interventinterventintere   Interventintervention <td></td> <td>ECO-Rail</td> <td></td> <td></td> <td></td> <td>FCO-Rail</td> <td>Descrip</td> <td>tion</td> <td></td> <td></td>		ECO-Rail				FCO-Rail	Descrip	tion						
Adapter   Hanger Bolt   ER-HB-200/WOMP   Hanger Bolt without mounting plate M10x200. Fixed to timber purlin only     Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 8   When using 3 rails, increase the spacing in the tables by 11%. When using 4 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 2 rails, increase the spacing in the tables by 16%. When using 3 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%.		Corrugated	ER-AD-0	. <u>.</u> C110		Adapter for corrugated iron roof								
Roof extender   ER-RE-200   Roof Hook Extender 200mm     Note 5   Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. For example suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 2-2012 for definition of Terrain category 3.     Note 6   For the definition of Downwind, Upwind end and middle, refer attached figure D9 from AS/NZS 1170.2-2011 Amdt 2-2012.     Note 7   For PV panels with length of 1700mm, increse the spacing in the tables by 15%. Do not apply this note with note 8 at the same time.     Note 8   When using 3 rails, increase the spacing in the tables by 11%. When using 4 rails, increase the spacing in the tables by 19%. Do not apply this note with note 7 at the same time.     Note 9   For PV panels with length of 1650mm, When using 2 rails, increase the spacing in the tables by 16%. When using 3 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%. When using 4 rails, increase the spacing in the tables by 19%.		Hanger Bolt	ER-HB-2	200/WOM	1P	Hanger Bolt without mounting plate M10x200. Fixed to								
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